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ORIGINAL PAPER

High Burden of Mental Health Problems, Substance Use, Violence, and Related Psychosocial Factors in Transgender, Non-Binary, and Gender Diverse Youth and Young Adults

Michael E. Newcomb[1,2] · Ricky Hill[2] · Kathleen Buehler[1,2] · Daniel T. Ryan[1,2] · Sarah W. Whitton[3] · Brian Mustanski[1,2]

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Abstract
Transgender and gender diverse (TGD) people are disproportionately impacted by various health issues and associated risk factors, but little is known about differences in these outcomes between gender identities within the TGD population. This study characterized the health of a diverse sample of TGD youth and young adults. Data were taken from the baseline visit of two longitudinal studies in the Chicago area, RADAR ($N = 1079$, M age = 20.8 years) and FAB 400 ($N = 488$, M age = 19.57 years), which are cohorts of young sexual and gender minorities assigned male at birth (AMAB) and assigned female at birth (AFAB), respectively. There was a combined sample of 214 TGD (128 AFAB, 86 AMAB) individuals across cohorts. We examined differences between gender identities in self-reported health and related psychosocial variables, and compared TGD youth and their cisgender sexual minority peers from their cohort of origin on all variables. Among TGD youth, we found high rates of depression and suicidality (ideation, plan, attempt), violence (trauma, victimization, childhood sexual abuse), and substance use (cigarette, alcohol, illicit drug use). With the exception of depression, transgender women and non-binary AMAB youth reported worse health outcomes than transgender men and non-binary AFAB youth. Non-binary AMAB youth reported the highest rates of certain outcomes, including traumatic experiences and suicidal ideation. TGD youth generally reported worse outcomes than cisgender sexual minority youth; these differences were less pronounced among AFAB youth. Findings point to the diversity of experiences within the TGD population and critical needs for intervention approaches to mitigate health disparities.

Keywords Transgender · Non-binary · Mental health · Violence · Substance use · Gender identity

Introduction

Transgender and gender diverse (TGD) people are a group for whom their sex assigned at birth differs from their gender identity (James et al., 2016). The TGD population is diverse and includes transgender women (individuals assigned male at birth who identify as women), transgender men (individuals assigned female at birth who identify as men), as well as individuals whose gender identity is non-binary (e.g., gender non-conforming, genderqueer people) or who do not identify with a gender. A small but growing literature has examined the health of TGD people, and data suggest that TGD people are at substantially elevated risk for various negative health outcomes compared to cisgender people (i.e., individuals whose sex assigned at birth matches their gender identity) (e.g., James et al., 2016). Further, evidence from samples of high school students and youth suggests these disparities are already present by adolescence (e.g., Eisenberg et al., 2017; Perez-Brumer, Day, Russell, & Hatzenbuehler, 2017). Less is known about the health of non-binary individuals (Connolly, Zervos, Barone, Johnson, & Joseph, 2016), as most of the existing research base on TGD health either focuses on transgender-identified individuals alone or combines transgender and non-binary individuals into a single group (for exceptions, see Aparicio-Garcia, Diaz-Ramiro, Rubio-Valdehita, Lopez-Nunez, & Garcia-Nieto, 2018; Tabaac, Sutter, Wall, & Baker, 2018; Thorne et al., 2018). The goal of this

✉ Michael E. Newcomb
newcomb@northwestern.edu

[1] Department of Medical Social Sciences, Northwestern University Feinberg School of Medicine, Chicago, IL, USA

[2] Department of Medical Social Sciences, Institute for Sexual and Gender Minority Health and Wellbeing, Northwestern University, 625 N. Michigan Ave., 14-059, Chicago, IL 60611, USA

[3] Department of Psychology, University of Cincinnati, Cincinnati, OH, USA

study was to characterize the health of a heterogeneous sample of TGD youth, as well as to add to the growing literature by examining differences between different gender identities in the prevalence of health outcomes and related psychosocial variables.

Research on the health of TGD youth, including adolescents, emerging adults, and young adults, is particularly important, because these are the developmental periods in which mental health problems (e.g., depression, suicidality) escalate sharply (Thapar, Collishaw, Pine, & Thapar, 2012) and various health-related risk behaviors are at their highest, including alcohol, marijuana, and illicit drug use (Bachman et al., 2002). Psychosocial stressors (e.g., lack of social support, violence) have particularly profound effects during these developmental periods, as youth during these stages are transitioning from living at home to more independent adulthood, leaving them particularly vulnerable to the impact of stress (Arnett, 2000).

Although the research base is growing, relatively few studies have attempted to estimate the health status of TGD communities in the U.S. (Grant et al., 2011; James et al., 2016; Landers & Kapadia, 2017; Meyer, Brown, Herman, Reisner, & Bockting, 2017). Existing community-based studies have found elevated rates of discrimination, violence, and victimization in TGD compared to cisgender people (Aparicio-Garcia et al., 2018; Grant et al., 2011; James et al., 2016; Reisner et al., 2015; White Hughto, Reisner, & Pachankis, 2015), and more recent population-based studies of TGD youth have replicated these findings (Coulter, Bersamin, Russell, & Mair, 2018; Day, Perez-Brumer, & Russell, 2018; Eisenberg et al., 2017; Gower et al., 2018; Meyer et al., 2017). In fact, evidence suggests that between 50–90% of TGD people will experience verbal harassment or disrespect related to their gender identity in their lifetime, and at least 25% will experience physical assault or violence due to their perceived gender identity (Clements-Nolle, Marx, & Katz, 2006; Freese, Ott, Rood, Reisner, & Pantalone, 2018; Grant et al., 2011; James et al., 2016; McCann & Brown, 2017). The 2015 US Transgender Survey (USTS) (James et al., 2016), a large non-representative survey of the health and well-being of TGD adults ($N = 27{,}715$), assessed a wide array of experiences of discrimination and violence and found troublingly high rates. First, 77% of respondents reported having experienced verbal or physical abuse at school (i.e., during K-12 years), and 50% of those who were out to their family experienced at least one form of rejection from that family during childhood or adulthood. Further, nearly half (46%) were verbally harassed in the past year because of being TGD, and 47% had been sexually assaulted in their lifetime (James et al., 2016).

The persistent marginalization experienced by many TGD people is likely in large part responsible for elevated rates of risk behavior engagement and negative health outcomes observed in TGD populations (Hendricks & Testa, 2012). Compared to cisgender people, TGD individuals are more likely to use tobacco, alcohol, or other substances to cope with stress, and these findings have been described with both community samples (Freese et al., 2018; Grant et al., 2011; James et al., 2016) and population-based datasets (Coulter et al., 2018; Day, Fish, Perez-Brumer, Hatzenbuehler, & Russell, 2017; Eisenberg et al., 2017; Meyer et al., 2017). Indeed, 29% of USTS respondents reported illicit drug use in the past month, which is three times the rate of the general population (James et al., 2016). With regard to mental health, 39% of USTS respondents endorsed serious psychological distress in the past month, compared to only 5% of the general population, and among youth the rate was even higher (53%) (James et al., 2016). Indeed, depression and anxiety have repeatedly been found to be elevated in TGD communities (Connolly et al., 2016; Eisenberg et al., 2017; Freese et al., 2018; Grant et al., 2011; James et al., 2016; Khobzi Rotondi, 2012; Thorne et al., 2018), and suicidal ideation and attempts are at epidemic levels (Gower et al., 2018; Perez-Brumer et al., 2017): 82% have considered suicide at some point in their life; 48% have seriously considered killing themselves in the past year; and 40% reported a lifetime suicide attempt (nine times the rate in the general population) (James et al., 2016). Mental health problems are also common in clinical samples of youth referred for treatment of gender dysphoria (e.g., Bechard, VanderLaan, Wood, Wasserman, & Zucker, 2017), but gender-affirming treatment significantly improves health and well-being in TGD youth (Connolly et al., 2016; de Vries, Steensma, Doreleijers, & Cohen-Kettenis, 2011).

While existing studies have highlighted the important disparities in health outcomes between TGD and cisgender people, most of this research has examined TGD people as a single group. This approach assumes that all identities within the TGD population experience psychosocial stressors and resulting health outcomes uniformly, which is unlikely given the diverse identities and experiences within this population. Several exceptions point to important differences between non-binary, transgender, and cisgender people (Aparicio-Garcia et al., 2018; James et al., 2016; Thorne et al., 2018). For example, the USTS found higher rates of serious psychological distress among non-binary people compared to transgender women and men, while transgender men reported higher rates of lifetime suicide attempts (James et al., 2016). Similarly, Thorne et al. (2018) found that non-binary people reported more symptoms of depression and anxiety than transgender women and men. The USTS also found that transgender women of color (including Black and Latina women) were at particularly high risk for various experiences of violence (James et al., 2016), but, in contrast, Aparicio-Garcia et al. (2018) found that harassment and lack of social support were more common among non-binary compared to transgender people. Given the limited existing research in this area, it is critically important to replicate these initial findings, as well as to examine more fine-grained differences in health outcomes and related risk factors across various gender identities, including comparisons between non-binary, transgender, and cisgender people.

The current study aimed to fill this gap in the literature by utilizing data from two large, unique community cohorts of sexual and gender minority youth and young adults in the Chicago area. These analyses add two unique contributions to the literature. First, we examined the prevalence of health outcomes in a sample of youth that spans multiple developmental periods during which youth are vulnerable to negative health outcomes, including adolescence, emerging adulthood, and young adulthood. Second, we analyzed differences in health between various gender identities. To do this, we conducted two sets of analyses to characterize TGD experiences with mental health, substance use, and related psychosocial risk factors: (1) we examined mean differences in all outcome variables between transgender men, transgender women, non-binary assigned female at birth (AFAB) youth, and non-binary assigned male at birth (AMAB) youth, and (2) we examined differences between TGD youth and their cisgender sexual minority peers from their cohort of origin (i.e., TGD AFAB youth vs. cisgender sexual minority women; TGD AMAB youth vs. cisgender sexual minority men) on all previously noted outcome variables. Because of the limited research examining differences in health and psychosocial experiences between gender identities within the TGD youth population, we made no a priori hypotheses about gender identity differences in the prevalence of the outcome variables examined in the present study. However, we anticipated that TGD youth would report significantly worse scores on all health and related variables compared to their cisgender sexual minority peers.

Method

Participants

Data for these analyses were taken from two independent samples: RADAR (current $N = 1079$) and FAB 400 ($N = 488$). RADAR is an ongoing longitudinal cohort study of young sexual and gender minorities assigned male at birth in Chicago (M age = 20.8 years, SD = 3.01, range 16–29 at baseline), including young sexual minority men, transgender women, and non-binary AMAB youth (Mustanski et al., 2019). The primary objective of this cohort study is to apply a multilevel perspective to a syndemic of health issues associated with HIV and substance use. FAB 400 is an ongoing longitudinal cohort study of young sexual and gender minorities assigned female at birth in Chicago (M age = 19.57 years, SD = 3.65, range 16–32 at baseline), including sexual minority women, transgender men, and non-binary AFAB youth (Whitton, Dyar, Mustanski, & Newcomb, 2019). FAB 400 aims to identify risk and protective factors for intimate partner violence and other associated health issues.

The analytic sample of TGD youth ($N = 214$) was composed of 128 TGD AFAB youth from the FAB 400 cohort and 86 TGD AMAB youth from the RADAR cohort. See Table 1 for a full demographic breakdown of the analytic sample. Approximately half (47.7%) of the full analytic sample was transgender, while the other half had a non-binary identity (52.3%). Among the TGD AMAB individuals, 67.4% identified as transgender women and 32.6% identified with a non-binary identity. Of the non-binary AMAB youth, the most frequently endorsed identities were non-binary (25%), agender/gender neutral (21.4%), and genderqueer (17.9%). Among TGD AFAB participants, 34.4% identified as transgender men, while 65.6% identified with a non-binary identity. Of the non-binary AFAB youth, the most frequently endorsed identities were genderqueer (36%) and gender non-conforming (35%).

Procedure

The current study utilized data from the baseline visits of the RADAR and FAB 400 cohort studies. Baseline data for FAB 400 were collected from November 2016 to December 2017, while baseline data collection for RADAR began in February 2015 and is ongoing. These cohort studies purposefully used analogous data collection procedures and measures, allowing for combining analyses across samples. Data were collected using computer assisted self-interview (CASI) software. For analyses comparing TGD individuals ($N = 214$ across both studies) to their cisgender sexual minority counterparts, we utilized an analytic sample of 360 sexual minority women from FAB 400 and 993 cisgender sexual minority men from RADAR (demographic composition of the full cohort samples is reported elsewhere; Mustanski et al., 2019; Whitton et al., 2019).

Measures

All measures listed below were administered in both cohort studies. Note that the Cronbach's alpha statistics reported below are for the full sample in each cohort study.

Demographics

As a part of the baseline survey, participants provided demographic information, such as age, sex assigned at birth, gender identity, race/ethnicity, sexual orientation identity, and highest completed level of education. In RADAR, the gender identity item was interviewer-administered. Participants identified themselves as male, female, transgender, or "not listed." Interviewers encouraged non-binary participants to select "not listed" and provide their specific gender identity. In FAB 400, gender identity was a self-report item and included the response options: male, female, transgender, gender non-conforming, genderqueer, non-binary, and "not listed." Due to low representation of certain groups, gender identity was reduced to six categories: transgender women, transgender men, non-binary

Table 1 Demographic characteristics of the baseline transgender and gender diverse analytic sample, $N = 214$

Demographic	TGD AFAB		TGD AMAB	
	N	%	*N*	%
Gender identity				
Transgender	44	34.4	58	67.4
Other non-cisgender identity	84	65.6	28	32.6
Race/ethnicity				
Black/African American	26	20.3	38	44.2
Hispanic or Latino/a/x	31	24.2	16	18.6
White	42	32.8	20	23.3
Other	29	22.7	12	14.0
Education				
High school diploma or lower	56	43.8	50	58.2
Some college	67	52.3	30	34.9
Undergraduate degree or higher	5	3.9	6	7.0
Sexual orientation identity				
Gay	11	8.6	30	34.9
Lesbian	10	7.8	1	1.2
Bisexual	20	15.6	12	14.0
Queer	38	29.7	11	12.8
Unsure/questioning	4	3.1	3	3.5
Straight/heterosexual	2	1.6	17	19.8
Not listed	43	33.6	12	14.0
	M	SD	*M*	SD
Age (in years)	19.04	3.18	21.91	3.25

TGD transgender and gender diverse, *AFAB* assigned female at birth, *AMAB* assigned male at birth

AFAB youth, non-binary AMAB youth, cisgender women, and cisgender men.

There were slight differences in the self-reported sexual orientation identity categories presented to participants at the baseline of each cohort (i.e., pansexual and asexual were options in FAB 400). As such, sexual orientation identity was collapsed into the following categories for these analyses: gay, lesbian, bisexual, queer, unsure/questioning, straight/heterosexual, and other labels. Race/ethnicity was reduced to four categories: Black/African American, Hispanic or Latino/*a*/*x*, White, and other race (i.e., Asian, multi-racial, and other). Education was reduced to three categories: high school diploma or lower (i.e., 8th grade, some high school, GED, or high school diploma), some college (i.e., some college or trade school certificate), and undergraduate degree or higher (i.e., undergraduate degree, some graduate school, or graduate degree).

Depression

Depression was assessed using the Patient-Reported Outcomes Measurement Information System (PROMIS) Depression–Short Form 8A instrument (Pilkonis et al., 2011). The 8-item instrument assesses self-reported negative mood, views of self, social cognition, and decreased positive affect and engagement in the past seven days. Example items include: "I felt worthless" and "I felt unhappy." Participants were asked to respond how often they felt that way on a 5-point Likert scale (1 = never, 5 = always). Individual items were summed and converted into standardized *T*-scores ($M = 50$, SD = 10) to create a composite score (TGD analytic sample range 38.2–81.3) with higher scores indicating greater levels of depression. Measure reliability was found to be high in both of the cohort studies (RADAR: $\alpha = .95$; FAB 400: $\alpha = .94$). For descriptive purposes, scores were categorized into none to slight (scores less than 55), mild (55–59.9), moderate (60–69.9), and severe (70 and over), in line with recommended cutoffs (American Psychiatric Association, 2018).

Sexual and Gender Minority-Based Victimization

A 6-item measure designed to assess the prevalence of sexual and gender minority-related victimization and harassment in the past 6 months was administered. The measure was developed based on existing work on lesbian, gay, and bisexual experiences of victimization (D'Augelli, Hershberger, & Pilkington, 1998). Example items include: "In the past 6 months,

how many times have you been threatened with physical violence because you are, or were thought to be gay/lesbian, bisexual or transgender?" and "In the past 6 months, how many times has someone chased or followed you because you are, or were thought to be gay/lesbian, bisexual or transgender?" Participants were asked to respond using a 4-point scale (0 = never to 3 = three times or more). Individual items were recoded to create binary variables indicating whether or not the participant had ever experienced each form of victimization in the past 6 months. Recoded items were summed to create a composite score (range 0–6), with higher scores indicating more experiences of victimization. Measure reliability was found to be high (RADAR: $\alpha = .86$; FAB 400: $\alpha = .87$).

Alcohol Use and Associated Problems

The Alcohol Use Disorder Identification Test (AUDIT), a 10-item tool assessing consumption, behaviors, and problems related to alcohol use in the past 6 months, was administered (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). Example items include: "How often do you have a drink containing alcohol?" and "Have you or someone else been injured because of your drinking?" Individual items were summed to create a composite score (range 0–40) with higher scores indicating higher levels of problematic drinking. Measure reliability was found to be high (RADAR: $\alpha = .81$; FAB 400: $\alpha = .81$). For descriptive purposes, scores were categorized into low risk of alcohol use disorder (scores less than 8), moderate risk (8–15), high risk/possibly dependent (16–19), and high risk/almost certainly dependent (20 or more), in line with recommended cutoffs.

Marijuana Use and Associated Problems

The Cannabis Use Disorder Identification Test-Revised (CUDIT-R), an 8-item tool assessing consumption, behaviors, and problems related to cannabis use in the past 6 months, was administered (Adamson et al., 2010). The CUDIT-R was adapted from the 10-item CUDIT, which was a direct modification of the AUDIT (Adamson & Sellman, 2003). Example items include: "How often do you use marijuana?" and "How often during the past 6 months did you fail to do what was normally expected from you because of using marijuana?" Individual items were summed to create a composite score (range 0–32) with higher scores indicating higher levels of problematic cannabis use. Measure reliability was found to be acceptable (RADAR: $\alpha = .74$; FAB 400: $\alpha = .74$). For descriptive purposes, scores were categorized into low risk of cannabis use disorder (scores less than 8), hazardous use (8–11), and possible cannabis use disorder (12 more), in line with recommended cutoffs.

Perceived Social Support

The Multidimensional Scale of Perceived Social Support (MSPSS) is a 12-item scale that assesses participants' perceptions of the adequacy of their social support (Zimet, Powell, Farley, Werkman, & Berkoff, 1990). The measure has three subscales: family support, friend support, and significant other support. Each subscale consisted of four items. Example items include: "My family really tries to help me" and "I can talk about my problems with my friends." Participants were asked to respond about the extent to which they agreed with each statement on a 7-point Likert scale (1 = very strongly disagree, 7 = very strongly agree). Individual subscale scores (range 1–7) and a total composite score (range 1–7) were created by averaging individual items with higher scores indicating higher levels of support. Measure reliability was high: family support (RADAR: $\alpha = .91$; FAB 400: $\alpha = .93$), friend support (RADAR: $\alpha = .90$; FAB 400: $\alpha = .95$), significant other support (RADAR: $\alpha = .97$; FAB 400: $\alpha = .95$), and total social support (RADAR: $\alpha = .88$; FAB 400: $\alpha = .90$).

Traumatic Experiences

The investigative team created a checklist of traumatic events based on the post-traumatic stress disorder module of the Computerized Diagnostic Interview Schedule for the DSM-IV (CDIS-IV) (Robins et al., 2000). The checklist was modified to exclude military combat related experiences or experiences that were considered rare or inappropriate for an urban setting. Example items included in the checklist are: "Been shot or stabbed" and "Been in a serious accident." An additional item, "Kicked out of a caregiver's house," was added to better capture the experiences of sexual and gender minority youth. The 11-item list was administered twice; participants were asked to select all events that they had experienced in their lifetime and in the past 6 months. A composite score indicating the number of traumatic events a participant had experienced was computed by counting the number of distinct events each participant endorsed for each of the two time frames.

Suicidality

Suicidal ideation, planning, and attempts in the past 6 months were assessed using three items from the Youth Risk Behavior Survey (CDC, 2014). The items were: "During the past 6 months, did you ever seriously consider attempting suicide?", "During the past 6 months, did you make a plan about how you would attempt suicide?", and "During the past 6 months, how many times did you actually attempt suicide?" Participants were asked to respond by choosing either "Yes" or "No" for

the first two questions, and 0 times, 1 time, 2 or 3 times, 4 or 5 times, or 6 or more times for the third question. Responses to the third question were recoded to create a binary variable indicating whether or not any suicide attempt occurred in the past 6 months.

Current Smoker

Cigarette smoking status was assessed using a single item: "Have you ever smoked cigarettes?" Responses options were: never, once or twice, occasionally but not regularly, regularly in the past, and regularly now. If participants endorsed the option "regularly now," they were coded as current smokers.

Non-Prescription Illicit Drug Use

Participants were asked about their experiences with non-prescription illicit drug use. Participants were asked to select which illicit drugs that they had used in the past 6 months. Due to low endorsement of use of certain illicit drugs, binary variables were created indicating whether or not participants endorsed stimulant use (cocaine and/or methamphetamines), club drug use (GHB, ketamine, and/or ecstasy), or other drug use (heroin, inhalants, hallucinogens or psychedelics, and/or other drugs).

Childhood Sexual Abuse

Based on the work of Leserman (2005), we administered six items to assess the prevalence of self-reported unwanted childhood sexual experiences/abuse, including experiences before the age of 13 and between the ages of 13 and 17. Example items include: "Before your 13th birthday, did an adult or someone at least 5 years older than you ever touch the sex organs of your body when you did not want this? By touch we mean with their hands, mouth or objects on your penis, vagina, pubic area or anus." and "Between your 13th and 17th birthdays, did anyone 10 years older than you ever have sexual intercourse (including vaginal or anal intercourse) with you when you did not want this?" Participants were asked to respond by choosing either "Yes" or "No."

Statistical Analyses

All analyses were conducted using IBM SPSS Statistics for Windows, version 25. First, we conducted a series of ANOVA analyses to examine differences in health outcomes between transgender women, transgender men, non-binary AFAB youth, and non-binary AMAB youth. Separate ANOVA analyses were conducted to test for differences in depression, victimization, alcohol problems, marijuana problems, perceived social support, and traumatic experiences. Post hoc analyses using Tukey's HSD test were calculated to identify the specific between group differences. Effect sizes (η^2) were calculated for each ANOVA and converted to Cohen's d for consistency of interpretation (Cohen, 1988). A series of 4×2 chi-square analyses were performed using the same gender identity groups and the following binary outcomes: suicidality, smoking, illicit drug use, and CSA. In cases in which cell counts were lower than 5, Fisher's exact tests were performed. Post hoc analyses using Bonferroni tests were calculated to examine pairwise comparisons of column proportions and identify specific between group differences. Effect sizes (V) were calculated for each chi-square and converted to Cohen's d for consistency of interpretation (Rosenthal, 1994).

Next, we conducted a series of regression analyses to compare health outcomes between TGD and cisgender participants in their respective cohort of origin (i.e., TGD AFAB [$N = 128$] youth vs. cisgender sexual minority women [$N = 360$] in FAB 400; TGD AMAB youth [$N = 86$] vs. cisgender sexual minority men [$N = 993$] in RADAR). Note that the demographic composition of the full FAB 400 and RADAR cohorts is reported elsewhere (Mustanski et al., 2019; Whitton et al., 2019). Separate multiple linear regression analyses were conducted to assess differences in depression, victimization, alcohol problems, marijuana problems, social support, and traumatic experiences. Effect sizes (r_p) were calculated for the effect of gender and converted to Cohen's d for consistency of interpretation (Rosenthal, 1994). Similarly, separate logistic regression analyses were run to assess whether there were differences between TGD and cisgender sexual minority youth in likelihood of suicidality, smoking, illicit drug use, and CSA. Age, race/ethnicity, and education were included in all regression models as covariates.

Results

Descriptive Data on Analytic Sample of Transgender and Gender Diverse Youth

See Table 1 for a demographic breakdown of the TGD AFAB and TGD AMAB samples. Analyses revealed some significant differences between TGD AFAB and TGD AMAB youth in demographic characteristics. TGD AMAB youth were more likely to identify as transgender, while TGD AFAB youth were more likely to identify as non-binary ($\chi^2[1, N = 214] = 22.55$, $p < .001$). TGD AMAB youth were also significantly older than TGD AFAB youth ($t[179.67] = -6.38$, $p < .001$), and there was a larger proportion of Black/African Americans in the TGD AMAB sample ($\chi^2[3, N = 214] = 14.20$, $p < .01$). TGD AFAB youth reported achieving a higher level of education ($p < .05$, Fisher's exact).

See Table 2 for a summary of descriptive statistics of study variables for the TGD sample as a whole. For the entire sample,

TGD youth reported the lowest levels of perceived social support from families, compared to support from friends and significant others. Experiences with violence were not uncommon. TGD youth, on average, reported experiencing about one type of sexual or gender minority-based victimization in the past 6 months. Further, reports of lifetime and past 6 month traumatic experiences were also not uncommon. Converted to proportions, 35.5% reported at least one type of victimization in the past 6 months; 73.1% and 46.7% reported at least one lifetime and past 6 month traumatic experience, respectively. About a quarter reported any type childhood sexual abuse (either before age 13 or between ages 13–17).

With regard to mental health, the mean depression score fell within the "mild" range. Broken down by severity, 21.5% reported mild, 37.9% reported moderate, and 7.5% reported severe depression. Nearly one-third of the sample reported suicidal ideation in the past 6 months, and 6.7% reported a suicide attempt. Substance use was also common. Almost one-fifth of the sample reported current regular cigarette smoking. With regard to risk for alcohol use disorder (i.e., AUDIT score), 78.5% were in the low risk range, 16.8% in the moderate risk range, and 4.7% in the high risk range. In terms of risk for cannabis use disorder (i.e., CUDIT score), 72.9% were in the low risk range, 13.1% were in the hazardous use range, and 14% were in the possible cannabis use disorder range. With regard to illicit drugs, 9.8% reported stimulant use in the past 6 months, 7% reported club drug use, and 10.7% reported use of any other illicit drug.

Table 2 Descriptive statistics of health and related psychosocial variables in a sample of transgender and gender diverse youth, $N = 214$

Study variable	*M*	SD
Perceived social support-total[a]	4.85	1.24
Family support[a]	4.06	1.69
Friend support[a]	5.39	1.48
Significant other support[a]	5.08	1.87
Victimization[b]	0.25	0.49
Traumatic experiences (count)		
Lifetime[c]	1.75	1.71
Past 6 months[c]	0.61	0.97
Depression[d]	57.24	10.04
Alcohol-related problems[e]	4.64	5.80
Marijuana-related problems[f]	5.28	6.26
	N	%
Childhood sexual abuse (CSA)		
Any CSA before age 13	50	23.4
Any CSA between age 13–17	32	15.0
Any CSA	60	28.0
Any penetrative CSA	34	16.0
Suicidality		
Ideation	63	30.0
Planning	26	12.4
Attempt	14	6.7
Current regular cigarette smoking	41	19.2
Illicit drug use		
Stimulant use	21	9.8
Club drug use	15	7.0
Other drug use	23	10.7

All study variables are reported for based on past 6 months, unless noted otherwise

[a]Absolute range, 1–7

[b]Absolute range, 0–6

[c]Absolute range, 0–11

[d]Absolute range, 38.20–81.30

[e]Absolute range, 0–40

[f]Absolute range, 0–32

Gender Identity Differences in Health Outcomes and Psychosocial Risk Factors

Social Support, Victimization, Childhood Sexual Abuse, and Trauma. A summary of the ANOVA and chi-square results exploring group differences in outcomes can be found in Tables 3 and 4, respectively. Analyses found significant differences between gender identities in total perceived social support ($F[3, 210] = 5.30$, $p < .01$, $d = 0.55$), peer support ($F[3, 210] = 10.10$, $p < .001$, $d = 0.77$), and significant other support ($F[3, 210] = 7.31$, $p < .001$, $d = 0.63$). Transgender women reported significantly lower total social support and significant other support compared to transgender men and non-binary AFAB youth, and they reported significantly lower peer support compared to all other groups. No significant differences between groups were observed in perceived family support. There were significant differences between gender identity groups in self-reported sexual and gender identity-based victimization ($F[3, 210] = 9.25$, $p < .001$, $d = 0.72$), such that both transgender women and non-binary AMAB youth reported more victimization than transgender men and non-binary AFAB youth. There were gender identity differences in the experience of CSA before 13 ($\chi^2[3, N = 214] = 10.83$, $p < .05$, $d = 0.47$), between 13 and 17 ($p < .05$, $d = 0.47$), and penetrative CSA at any age ($p < .01$, $d = 0.58$). A significantly greater proportion of transgender women reported CSA before 13 (compared to non-binary AFAB youth), CSA between 13 and 17 (compared to transgender men), and penetrative CSA at any age (compared to transgender men and non-binary AFAB youth). Finally, we observed significant differences between gender identities in lifetime traumatic experiences ($F[3, 208] = 3.73$, $p < .05$, $d = 0.46$), such that non-binary AMAB youth reported significantly more lifetime traumatic experiences than transgender men.

Mental Health. Analyses revealed significant differences between gender identities in depression ($F[3, 210] = 13.52$, $p < .001$, $d = 0.88$), such that transgender women reported significantly lower depression scores than non-binary AMAB youth, non-binary AFAB youth, and transgender men. We also observed differences in suicidal ideation ($\chi^2[3, N = 210] = 13.36$, $p < .01$, $d = 0.52$), such that a significantly greater proportion of non-binary AMAB youth reported suicidal ideation compared to transgender women. Fisher's exact test also revealed significant group differences in suicide attempts ($p < .05$, $d = 0.43$). Transgender women and non-binary AMAB youth were more likely to report a suicide attempt in the last 6 months than transgender men and non-binary AFAB youth, but post hoc Bonferroni tests did not detect any significant pairwise differences. We found no significant differences in endorsement of suicide planning.

Substance Use. ANOVA results yielded significant differences between gender identity groups in AUDIT scores ($F[3,210] = 5.26$, $p < .01$, $d = 0.55$), such that non-binary AMAB youth reported more alcohol problems than both transgender men and non-binary AFAB youth. There were also gender identity differences in likelihood of current smoking status ($\chi^2[3, N = 214] = 27.94$, $p < .001$, $d = 0.77$),

Table 3 Summary of results from ANOVAs examining gender identity differences in health outcomes and related risk factors

Outcome	TGD AFAB				TGD AMAB				Total, $N = 214$		ANOVA results	
	Transgender men, $N = 44$		Non-binary AFAB, $N = 84$		Transgender women, $N = 58$		Non-binary AMAB, $N = 28$					
	M	SD	*M*	SD	*M*	SD	*M*	SD	*M*	SD	*F*	*P* value
Depression	59.04[a]	9.02	60.10[a]	7.31	50.66[b]	11.34	59.44[a]	10.07	57.24	10.04	13.52	< .001
Victimization	0.52[a]	0.95	0.46[b]	1.02	1.40[a]	1.95	1.79[a]	1.95	0.90	1.53	9.25	< .001
AUDIT score	3.70[b]	4.07	3.44[b]	4.03	5.52	7.32	7.89[a]	7.56	4.64	5.80	5.26	.002
CUDIT score	3.93	5.16	4.71	6.12	6.41	7.32	6.71	5.42	5.28	6.26	2.07	.106
Social support												
Total support	5.00[a]	0.92	5.14[a]	0.95	4.35[b]	1.54	4.73	1.44	4.85	1.24	5.30	.002
Family	3.73	1.77	4.18	1.51	4.21	1.95	3.95	1.49	4.06	1.69	0.90	.442
Friend	5.69[a]	0.95	5.71[a]	1.14	4.53[b]	1.88	5.71[a]	1.46	5.39	1.48	10.10	< .001
Significant other	5.59[a]	1.44	5.53[a]	1.44	4.32[b]	2.13	4.54	2.38	5.08	1.87	7.31	< .001
Traumatic experiences												
Lifetime	1.18[b]	1.42	1.66	1.39	2.00	2.03	2.43[a]	1.97	1.75	1.71	3.73	.012
Past 6 months	0.35	0.78	0.54	0.79	0.79	1.21	0.82	1.06	0.61	0.97	2.37	.071

TGD transgender and gender diverse, *AFAB* assigned female at birth, *AMAB* assigned male at birth, *AUDIT* alcohol use disorder identification task, *CUDIT* cannabis use disorder identification task

[a,b]Significant differences between groups are present for those cases in which superscript letters differ. In these cases, "a" represents the higher value and "b" represents the lower value

Table 4 Summary of chi-square analyses examining gender identity differences in health outcomes

Outcome	TGD AFAB				TGD AMAB				Total analytic sample, $N=214$			Chi-square results	
	Transgender men, $N=44$		Non-binary AFAB, $N=84$		Transgender women, $N=58$		Non-binary AMAB, $N=28$						
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*χ2*	*Df*	*P*
Suicidality													
Suicidal ideation	15	35.7	26	31.7	8	13.8[b]	14	50.0[a]	63	30.0	13.36	3, 210	.004
Suicide plan	3	7.1	12	14.6	6	10.3	5	17.9	26	12.4	2.44[c]	N.A.[c]	.504
Suicide attempt	0	0.0[b]	3	3.7[b]	7	12.1[a]	4	14.3[a]	14	6.7	9.40[c]	N.A.[c]	.013
Drug use													
Current smoker	3	6.8[b]	8	9.5[b]	24	41.4[a]	6	21.4	41	19.2	27.94	3, 214	< .001
Stimulant use	3	6.8	2	2.4[b]	12	20.7[a]	4	14.3	21	9.8	13.92[c]	N.A.[c]	.002
Club drug use	3	6.8	3	3.6	8	13.8	1	3.6	15	7.0	5.29[c]	N.A.[c]	.133
Other drug use	6	13.6	10	11.9	5	8.6	2	7.1	23	10.7	1.07[c]	N.A.[c]	.784
Childhood sexual abuse													
Before 13	7	15.9	13	15.5[b]	21	36.2[a]	9	32.1	50	23.4	10.83	3, 214	.012
Between 13 and 17	2	4.7[b]	10	11.9	16	27.6[a]	4	14.3	32	15.0	10.76[c]	N.A.[c]	.011
At any age	8	18.2	19	22.6	22	37.9	11	39.3	60	28.0	7.91	3, 214	.048
Penetrative CSA	3	7.0[b]	7	8.3[b]	18	31.0[a]	6	21.4	34	16.0	15.66[c]	N.A.[c]	.001

TGD transgender and gender diverse, *AFAB* assigned female at birth, *AMAB* assigned male at birth, *AUDIT* alcohol use disorder identification task, *CSA* childhood sexual abuse

[a,b]Significant differences between groups are present for those cases in which superscript letters differ. In these cases, "a" represents the higher value and "b" represents the lower value

[c]Denotes cases in which Fisher's exact test was used due to low cell sizes in certain groups. Degrees of freedom are not provided for Fisher's exact test

such that a significantly greater proportion of transgender women were current smokers compared to transgender men and non-binary AFAB youth. In terms of illicit drug use, we found differences in stimulant use ($p < .01$ [Fisher's exact test], $d = 0.54$), such that a significantly greater proportion of transgender women reported stimulant use compared to non-binary AFAB youth. We did not find differences in marijuana problems, club drug use, or other illicit drug use.

Differences Between TGD and Cisgender Sexual Minority Youth in Health Outcomes

To examine differences between TGD and cisgender youth, we conducted multiple regression analyses in which we compared TGD youth to the cisgender sexual minority youth in their cohort of origin (i.e., TGD AFAB vs. cisgender sexual minority female youth in FAB 400; TGD AMAB youth vs. cisgender sexual minority male youth in RADAR). Analyses found that TGD AMAB youth reported lower total social support ($\beta = -0.47$, $p < .01$, $d = 0.20$), family support ($\beta = -0.69$, $p < .001$, $d = 0.22$), and friend support ($\beta = -0.72$, $p < .001$, $d = 0.30$) compared to the cisgender sexual minority men in the RADAR cohort. TGD AMAB youth also reported more sexual and gender minority-based victimization ($\beta = 0.70$, $p < .001$, $d = 0.26$), and they were more likely to report any CSA before 13 (OR 1.84, $p < .05$), any CSA between 13 and 17 (OR 1.85, $p < .05$), and penetrative CSA at any age (OR 2.23, $p < .01$) compared to cisgender sexual minority men. With regard to mental health, TGD AMAB youth had a higher likelihood of suicidal ideation (OR 3.32, $p < .001$), suicide planning (OR 2.42, $p < .05$), and suicide attempt in the past 6 months (OR 3.99, $p < .001$). No significant differences were found in significant other support, traumatic experiences, depression, or any indicators of substance use.

Analyses revealed fewer differences between TGD AFAB youth and cisgender sexual minority women. TGD AFAB youth reported more victimization than cisgender sexual minority women ($\beta = 0.25$, $p < .05$, $d = 0.24$). TGD AFAB youth also reported more lifetime traumatic experiences ($\beta = 0.31$, $p < .05$, $d = 0.18$) and higher depression scores ($\beta = 3.01$, $p < .01$, $d = 0.30$) compared to cisgender sexual minority women in the FAB 400 cohort. TGD AFAB youth were more likely than cisgender sexual minority women to report suicidal ideation (OR 2.23, $p < .01$), but there were no significant differences in likelihood of suicide planning or attempt. Further, there were no significant differences in perceived social support, CSA, or any of the substance use indicators.

Discussion

The current study found high rates of various negative health outcomes and related psychosocial risk factors in a sample of TGD youth derived by combining data from the baseline visit of two existing cohort studies of sexual and gender minority adolescents, emerging adults, and young adults. In most cases, these health outcomes and negative psychosocial experiences were significantly elevated in TGD youth compared to their cisgender sexual minority peers in the cohort studies from which these participants were drawn. While rates of negative health outcomes and risk factors were high among all TGD gender identity groups, many of these outcomes were highest among TGD AMAB youth, including transgender women and non-binary AMAB youth, indicating that these youth may be at even higher risk for adverse health outcomes across multiple domains.

Consistent with prior literature (Coulter et al., 2018; Day et al., 2018; Eisenberg et al., 2017), TGD youth in this sample experienced high rates of negative psychosocial experiences, including lack of social support, sexual and gender minority-based victimization, and violence. First, TGD youth in this study reported that they received the least amount of support from families, compared to friends and significant others, which aligns with findings from the US Transgender Survey (USTS) (James et al., 2016). Indeed, the mean response for perceived family support across all TGD individuals in this study indicated that participants "neither agreed nor disagreed" that they received support from their families. Transgender women reported the lowest rates of both friend and significant other support compared to all other groups, and both transgender women and non-binary AMAB youth reported significantly lower social support from family and peers compared to cisgender sexual minority male youth.

Given the clear link between lack of social support (particularly from families) and negative health outcomes in sexual and gender minority samples (Coulter et al., 2018; McConnell, Birkett, & Mustanski, 2015; Newcomb, Heinz, & Mustanski, 2012; Ryan, Huebner, Diaz, & Sanchez, 2009), these differences may help to explain why, in general, TGD AMAB youth in this sample reported higher rates of most negative health outcomes relative to TGD AFAB youth. More work should be conducted to understand how various forms of support interact with one another to confer risk for or buffer against negative health outcomes. For example, it remains unclear whether the presence of strong friend or significant other support reduces the risk of negative health outcomes in the context of having a rejecting or unsupportive family or if having one supportive parent or family member compensates for lack of support for others in the family. Recent data from a sample of LGBTQ youth found that the influence of family support on mental health became less important over time among those youth who had high levels of peer support (McConnell, Birkett, & Mustanski, 2016), but this sample had a small proportion of TGD youth so results were not disaggregated by gender identity.

With regard to sexual and gender minority-based victimization and violence, TGD AMAB youth endorsed substantially higher rates than both TGD AFAB and cisgender sexual minority male youth. However, we must emphasize that reported rates of victimization in the past 6 months were unacceptably high for all youth. For example, approximately half of transgender women and non-binary AMAB youth reported at least one instance of victimization in the past 6 months, compared to about a third of transgender men and cisgender sexual minority male youth, and less than a quarter of non-binary AFAB youth and cisgender sexual minority female youth. These findings are consistent with the USTS, which found that 46% had been verbally harassed in the past year, and 9% had been physically attacked, because of being TGD (James et al., 2016). Furthermore, more than one-third of both transgender women and non-binary AMAB youth in our sample reported experiencing some type of CSA in their lifetime, and nearly one-third of transgender women reported ever experiencing penetrative CSA. Similarly, non-binary AMAB youth were the most likely to report having a traumatic experience in their lifetime, though reports of traumatic events were high across all groups. More specifically, 82.1% of non-binary AMAB youth reported at least one lifetime traumatic event, compared to 78% of non-binary AFAB youth, 72.4% of transgender women, and 59.1% of transgender men. Given the long-term effects of CSA and other violent experiences on mental health (e.g., depression, suicidality) and engagement in risk behaviors (substance use, sexual risk behaviors) (Lloyd & Operario, 2012; Maniglio, 2009), there is a clear need for both structural and individual interventions to prevent the occurrence of these experiences, in concert with individual interventions to help TGD youth cope with the effects of CSA when it does occur.

Based on the high rates of victimization, CSA, and other traumatic experiences, it is not surprising that TGD youth in this sample reported high rates of mental health problems and substance use (Maniglio, 2009). Consistent with prior work (Eisenberg et al., 2017; Perez-Brumer et al., 2017), analyses revealed very high rates of depression and suicidality, and in most cases these rates were significantly higher among TGD youth compared to their cisgender sexual minority peers. With regard to depression, the mean score for non-binary AFAB youth fell within the range indicative of moderate depression, while the means for non-binary AMAB youth and transgender men fell within mild depression range; these mean scores are substantially higher than the measure norm for the general population (Pilkonis et al., 2011). Transgender women had significantly lower scores for depression. However, the majority of transgender women in this sample were Black, and some data suggest that Black sexual and gender minority youth

have lower rates of depression than White youth (Burns, Ryan, Garofalo, Newcomb, & Mustanski, 2015; Mustanski et al., 2019). Consistent with prior reports (Perez-Brumer et al., 2017), and with data from the USTS that 82% of respondents reported lifetime suicidal ideation and 40% reported a lifetime suicide attempt (James et al., 2016), suicidality was at epidemic levels in this sample. Half of non-binary AMAB youth, and approximately one-third of transgender men and non-binary AFAB youth, reported past 6 month suicidal ideation. Further, more than 10% of transgender women and non-binary AMAB youth reported a suicide attempt in the past 6 months alone. These findings indicate that non-binary youth are at particularly high risk for depression and suicidal ideation, which is consistent with one recent report (Thorne et al., 2018), and TGD AMAB youth (both transgender women and non-binary AMAB youth) are at very high risk for suicide attempt. For comparison, the 2016 National Survey on Drug Use and Health (NSDUH) reported much lower rates of suicidal ideation (8.8%), planning (2.9%), and attempt (1.8%) among 18–25-year-olds in the general population during the past 12 months (Substance Abuse and Mental Health Services Administration, 2017). Given these disturbingly high rates, there is a shocking lack of funded research on suicidality in sexual and gender minority populations, which is a clear area of need.

Prior reports have documented substantial disparities in cigarette smoking, alcohol use, and illicit drug use between cisgender heterosexual youth and both cisgender sexual minorities (Corliss et al., 2014; Newcomb, Birkett, Corliss, & Mustanski, 2014; Talley, Hughes, Aranda, Birkett, & Marshal, 2014) and TGD youth (Coulter et al., 2018; Day et al., 2017; Eisenberg et al., 2017). Substance use was also strikingly high in this sample, particularly among transgender women and non-binary AMAB youth, including problematic alcohol use (24.1% and 42.8% at moderate to high risk for current alcohol use disorder, respectively), hazardous marijuana use (34.5% and 39.3%, respectively), current cigarette smoking (41.4% and 21.4%, respectively), and past 6 month stimulant use (20.7% and 14.3%, respectively). In most cases, these rates are substantially higher than those reported by large population-based studies of youth and adults (Pickens, Pierannunzi, Garvin, & Town, 2018; Substance Abuse and Mental Health Services Administration, 2017). For example, the 2016 NSDUH reported that among 18–25-year-olds, 9.4% were daily smokers, 10.1% were heavy drinkers, and 2.2% had used stimulants in the last month. While these findings may not be directly comparable in all cases, they point to vast disparities in substance use between cisgender and TGD youth.

It is important to note that the cisgender sexual minority men in the RADAR cohort reported substance use at similar rates to those of the TGD AMAB youth, which is consistent with prior research reporting high levels of alcohol and illicit drug use among young sexual minority men (e.g., Newcomb, Ryan, Greene, Garofalo, & Mustanski, 2014). Nevertheless, these high rates of use point to critically important targets for health promotion and HIV prevention. As documented in these analyses, TGD youth experience frequent stressors related to their gender and/or sexual orientation identities, and both general and minority stressors have been linked to substance use in sexual and gender minority samples (Hatzenbuehler, 2009; Hendricks & Testa, 2012; Meyer, 2003). Further, many of the social environments attended by young gay and bisexual men, and presumably transgender women and non-binary AMAB youth, are venues in which drinking and drug use may occur (e.g., bars, clubs), which may lead to more permissive substance use norms among some youth and thus higher rates of use in these populations. Thus, the combination of experiencing stressors related to sexual and/or gender identity and more permissive social norms likely contribute to the very high rates of substance use observed in this study.

Synthesizing across study findings, we observed several noteworthy patterns. First, TGD AMAB youth, including both transgender women and non-binary AMAB youth, reported worse outcomes on nearly all indicators of health and psychosocial risk factors compared to TGD AFAB youth, with the exception of depressive symptoms and suicidal ideation. The elevated rates of negative health outcomes and associated risk factors among TGD AMAB youth were also consistently higher than those reported by their cisgender sexual minority male peers, which means that TGD AMAB youth may be at disproportionate risk compared to all other groups of TGD and sexual minority youth observed in this study. Given the high rates of various psychosocial risk factors, including lack of social support, victimization, traumatic experiences, and CSA among TGD AMAB youth, it is perhaps not surprising that these youth also reported the most substance use and the highest rates of suicide attempt.

While this study did not examine the mechanisms driving these differences in health outcomes between TGD AMAB and AFAB youth, it indicates that some stressors or contextual factors may be unique to, or more elevated among, TGD youth who are assigned male at birth. Based on the limited existing literature, TGD AMAB youth may be more likely to experience poverty, have lower educational attainment and employment, experience more gender-based violence, and have higher likelihood of participation in sex work, even compared to TGD AFAB youth and cisgender sexual minority youth (Brennan et al., 2012; White Hughto et al., 2015). All of these factors may contribute to a particularly high burden of stress in these youth and consequently very high rates of negative health outcomes. Much more work needs to be done to understand the specific vulnerabilities associated with these troubling findings, as well as to understand the unique stressors and experiences of varied gender identities within the TGD population.

Another particularly important finding emerging from these data is that non-binary youth, particularly those assigned

male at birth, often experienced comparable or worse rates of negative health outcomes and related risk behaviors than their transgender and cisgender peers. Consistent with recent evidence (Thorne et al., 2018), both AFAB and AMAB non-binary youth reported the highest rates of depression (though these scores did not significantly differ from those of transgender men). Further, non-binary AMAB youth reported the most alcohol-related problems and traumatic experiences, as well as a staggeringly high rate of past 6 month suicidal ideation. Regrettably, the majority of the already limited research on TGD health has focused on people who identify as transgender, and in particular on transgender women (Connolly et al., 2016; Reisner et al., 2016), though several recent studies are notable exceptions (Aparicio-Garcia et al., 2018; Tabaac et al., 2018; Thorne et al., 2018). This lack of attention to non-binary youth may reflect the invisibility of these identities in health-related research or a misinformed belief that these youth are at lower risk for negative health outcomes than their transgender peers. Our data indicate that non-binary youth may be at even higher risk for some negative health outcomes compared to transgender youth in some cases, so it is clear that more research is needed to understand the unique needs of non-binary youth, which in itself is a diverse group of various different gender identities and expressions.

Finally, the effect sizes for differences in health and related outcomes were generally larger when examining differences within the TGD population compared to the differences between TGD youth and the cisgender sexual minority youth from their respective cohorts of origin. In some cases, TGD youth were more similar in their health outcomes to the cisgender sexual minority youth of their same sex assigned at birth than they were to TGD youth of a different sex assigned at birth. For example, TGD AMAB youth were more similar in their substance use behaviors to cisgender sexual minority male youth than they were to TGD AFAB youth, and TGD AFAB youth were more similar to cisgender sexual minority female youth in their perceived social support. This is not to say that, in general, TGD youth are more similar to their cisgender sexual minority peers with the same sex assigned at birth. Instead, these differences highlight the marked diversity within the TGD population in experiences with health and psychosocial factors that must be attended to in research and intervention development.

This study is not without limitations. First, these data were cross-sectional, so we are unable to make conclusions about what may be driving observed rates of, and differences in, health-related outcomes. There is an urgent need for longitudinal cohort studies with large enough samples of TGD individuals to examine health trajectories over time, as well as temporal ordering of predictors of health outcomes to more confidently draw causal inference. As we continue to follow these cohorts over time, we will be well-poised to answer some of these longitudinal questions. Related, our sample had low representation of certain gender identities, which meant that we had to collapse across some identities (e.g., various non-binary identities) when examining group differences. This sample was recruited as part of two community-based cohort studies. While community cohorts allow for the collection of variables nuanced to the experiences of TGD people (e.g., sexual and gender minority-based victimization), population-based studies allow for greater generalizability of findings. Importantly, very few population-based datasets have collected data on gender identity, making such analyses exceedingly rare. We urge various agencies who conduct population-based research on health outcomes to include questions assessing gender identity and sexual orientation identities in order to provide more generalizable estimates of health issues.

With regard to analyses, we acknowledge that the large number of analyses conducted in this study increased the likelihood of Type I error. However, if we were to use a more stringent criterion for significance (i.e., $p < .01$) to account for this possibility, the majority of the observed differences would remain significant, and those that would lose significance are those with relatively low base rates of endorsement. If we were to apply this correction to analyses, the differences between TGD groups in traumatic experiences and CSA would become non-significant (with the exception of penetrative CSA). Further, the differences between TGD AMAB youth and cisgender sexual minority male youth in certain indicators of CSA, as well as suicide planning, would become non-significant. Finally, the observed differences between TGD AFAB youth and cisgender sexual minority female youth in victimization and lifetime traumatic events would become non-significant.

Despite these limitations, the present data provide novel information about the health of transgender and gender diverse youth, as well as their experiences with various psychosocial risk factors that have implications for the onset and maintenance of health issues. Further, this study is one of the first to examine differences in health-related variables between groups of TGD youth, including transgender women, transgender men, non-binary AMAB youth, and non-binary AFAB youth. Taken together, these findings indicate that TGD youth are at high risk for negative health outcomes, likely due to their experience of various psychosocial risk factors (e.g., lack of social support, victimization, violence). Within this population, those youth assigned male at birth, including both transgender women and non-binary AMAB youth, reported the most elevated rates of nearly all negative health outcomes and related psychosocial variables. These findings point to a dire need for more research on the mechanisms driving these effects, as well as work on both individual-level and structural interventions to mitigate the vast health disparities experienced by TGD youth.

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Compliance with Ethical Standards

Conflict of interest The authors have no known conflicts of interest to disclose.

Ethical Statement This research was approved by the Institutional Review Board at Northwestern University. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed Consent Informed consent/assent was obtained from all individual participants included in the study.

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